REMARKS

Claims 1-14, 19-29, 31, 32, 34, 35, 40-46, 48 and 51-54 are pending in the application prior to entry of amendments submitted herewith. All of the pending Claims stand rejected. By amendment herewith, Claims 12, 13, 25, 35 and 52 are being changed and new Claims 55-58 are being added. All amendments are made without prejudice to, or disclaimer or dedication of any subject matter, and a right is specifically reserved to file continuation and/or divisional applications claiming any subject matter disclosed in the application.

Rejection Under 35 U.S.C. § 112, Second Paragraph

Claims 35 and 52-54 have been rejected under 35 U.S.C. § 112, second paragraph based on an assertion of indefiniteness. In particular, the Examiner has objected to the phrase "the heap leaching" as having insufficient antecedent basis. Claims 35 and 52 have been amended to address the objection, and it is respectfully requested that the rejection be withdrawn.

Rejections Under 35 U.S.C. § 103

The Examiner has stated several rejections under 35 U.S.C. § 103(a). In particular, the Examiner has rejected Claims 1-3 and 8 as being unpatentable over Hannifan et al. (US 3,441,316) in view of Yan (US 4,346,396); Claims 4-7, 9, 13, 19-24, 31, 32, 34, 40, 41 and 51-54 as being unpatentable over Hannifan et al. and Yan, and further in view of Spedden et al. (US 3,815,957); Claims 10-12 as being unpatentable over Hannifan et al. and Yan in view of Spedden et al. and further in view of Johnson et al. (US 4,381,873); Claims 14, 35, 42 and 44-46 as being unpatentable over Hannifan et al. and Yan in view of Spedden et al., and further in view of Young et al. (US 6,471,743); Claims 25-27, 29 and 43 as being unpatentable over Hannifan et al. and Yan in view of Spedden et al., and further in view of Lesty et al. (US 4,756,887); Claim 28 as being unpatentable over Hannifan et al., Yan, Spedden et al. and Lesty et al., and further in view of Milsom et al. (Field Geophysics 3rd Edition); and Claim 48 as being unpatentable over Hannifan et al. and Yan in view of Spedden et al., and further in view of Jones (US 5,223,024). The rejections are traversed.

Independent Claim 1 is directed to a method for extracting a component from a heap in which there is a selective remedial treatment of a heap that has already been subjected to component extraction by heap leaching. Through surveying, portions of the heap are identified that are deficient in extraction of the component following the prior heap leaching, in that component extraction from the identified portions of the heap is low in comparison to the average extraction of the component from the heap. The selective remedial treatment requires that, based on the surveying, at least one such portion identified as deficient in extraction is selected for remedial treatment and that each such selected portion of the heap is remedially treated through a well excavated into that portion of the heap.

The rejections are similar to those stated in the prior Office Action dated October 17, 2008, but with the addition of the Yan reference. As discussed in the response to the prior Office Action, selective remedial treatment as recited in the Claims is distinguished from non-selective, whole-heap treatments in which a number of wells are drilled into a heap in a grid pattern designed to treat the entire heap. The selective remedial treatment is also distinguished from *in situ* applications, which are not performed on a heap, but are performed on subterranean formations.

As discussed in the response to the prior Office Action, Hannifan et al. disclose leaching of waste dumps and *in situ* deposits by introducing leach liquor through a number of wells drilled into the waste dump or *in situ* deposit. The process disclosed by Hannifan et al. is non-selective.

The Examiner asserts that it would have been obvious to one of ordinary skill in the art based on the teachings of Hannifan et al. to selectively place wells into portions of a heap that are either un-leached or under-leached for any reason, with an asserted reasoning that the problem of un-leached and under-leached portions of heaps is known, as is the fact that wells are known to alleviate said problems. This characterization and conclusion by the Examiner are respectfully, disagreed with.

This asserted reasoning presumes that one of ordinary skill in the art considering the teachings of Hannifan et al. would select as a processing option conventional heap leaching with surface application of leach solution, even after having been advised by Hannifan of significant problems with such traditional heap leaching, and even though Hannifan et al. disclose an alternative process that addresses those problems. Moreover, after selecting conventional heap leaching one of ordinary skill in the art would still have to address the problems with such processing, such as

through further, non-conventional processing. However, such a result would be counter-intuitive based on the teachings of Hannifan et al., because Hannifan et al. propose a single-step process that addresses those problems. It is respectfully submitted that, based on the teachings of Hannifan et al., one of ordinary skill in the art would not find obvious the use of a processing option with the known problems of conventional heap leaching, and which problems would still have to be addressed through further, unidentified processing that would add complexity relative to the single-step process disclosed by Hannifan et al. Rather, one of ordinary skill in the art would be motivated to address the known problems by implementing the alternative, single-step process, as taught by Hannifan et al. Reaching a different result would appear to be contrary to common sense and prone to the biases of hindsight analysis.

In *KSR Int'l Co. v Teleflex Inc.*, 550 U.S. 398, 127 S.Ct. 1727, 167 L.Ed.2d 705, 82 U.S.P.Q.2d 1385 (2007), the Supreme Court set out an analysis for obviousness determinations that is flexible and based on common sense, but that also recognizes the inappropriateness of hindsight analysis. As a protection, the Court in *KSR Int'l* recognized the value of an explicit record of the obviousness analysis, quoting the following from *In re Kahn*, 441 F.3d 977, U.S.P.Q.2d 1329 (CAFC 2006) as follows: "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." KSR Int'l, at 550 U.S. 416, emphasis added. The Court followed a common sense approach, and warned against resorting to hindsight analysis, stating: "A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning . . . Rigid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it." *KSR Int'l*, at 550 U.S. 421.

Common sense, free of hindsight biases, indicates that one of ordinary skill in the art would not, based on Hannifan et al., find obvious implementing a more complex process including conventional heap leaching that Hannifan et al. finds to be problematic.

The Examiner notes that Hannifan et al. do not teach surveying a heap and identifying portions of the heap deficient in component extraction. However, the Examiner attempts to bridge that teaching gap by asserting that Yan teaches that core samplings can be taken from already

partially leached ores to calculate the proper mole ratio for a pre-leaching treatment, and teaches that after the treatment is finished, the regular leaching can be restarted. Yan, however, is specifically concerned with *in situ* leaching, and in particular of uranium, from subterranean formations (Column 1, lines 6-12). Yan does not discuss heap-leaching at all and, therefore, is not analogous art with respect to the claimed subject matter. However, even in the non-analogous situation of *in situ* processing, the teachings of Yan does not concern selective remedial treatment of portions of the formation.

The *in-situ* operation of Yan involves extraction of uranium from subterranean formations using leach solution that is injected into a well, and with pregnant lixiviant, or leachate, being produced from other wells spaced at a distance from the injection well. Within this processing context, Yan is particularly concerned with a CO_2/O_2 leaching system and a problem that injected into the formation of CO_2/O_2 will be consumed oxidizing the formation, and not leaching uranium, until the entire formation has been essentially oxidized. See, Yan, at column 1, line 49 through column 2, line 6. To address this problem, Yan proposes a non-selective pretreatment of the formation by introducing an oxidant into the formation to oxidize the formation prior to the commencement of CO_2/O_2 leaching (column 2, lines 10-40). Yan discloses that such a pretreatment may also be used to stimulate *in situ* uranium leaching from already partially leached formations, and Yan reports an experiment conducted on core samples taken from a south Texas uranium field. See, Yan at column 2, line 62 through column 3, line 2. However, it is clear that those core samples were not used to determine which, if any, portions of the subterranean formation were deficient in uranium extraction for selective remedial treatment. Rather, the core samples were used for laboratory-scale testing of the efficacy of the non-selective pretreatment process proposed by Yan to increase uranium recovery generally from the formation. The Examiner's assertion that "Yan teaches that core samplings can be taken from already partially leached ores to calculate the proper molar ratio used for a pre-leaching treatment" is not supported by the teachings of Yan. Regardless, there is no disclosure in Yan of either surveying a subterranean formation to identify portions deficient in uranium extraction, in that the extraction is low in comparison to average extraction from the formation, or performing a selective remedial treatment based on such surveying.

The other references cited by the Examiner were cited in the prior Office Action. As discussed in a response to the prior Office Action, none of those other references disclose selective heap treatment in a process as recited in Claim 1. To reiterate, Spedden et al., Johnson et al. and Lesty et al. all disclose the use of wells in relation to different processes for recovering a component from an *in situ* mineral formation, or heap or dump of material, with Spedden et al. and Johnson et al. disclosing hydraulic fracturing through wells. However, none of those references disclose selective remedial treatment of a heap based on identifying portions of a heap deficient in component extraction, in that extraction is lower than average extraction of the component. Milsom concerns geophysics and does not concern extraction of a component from the heaps. Jones and Young et al. disclose processes involving leaching of a component but do not disclose the use of wells in a heap, let alone in a process involving selective remedial treatment with the features as recited in Claim 1.

With respect specifically to Claims 25-29, each of these claims states one or more additional limitations involving use of noninvasive data collection to provide data for analysis to identify portions of the heap deficient in extraction of the component, recited in Claim 1. For Claims 25-27 and 29, the Examiner cites to Lesty et al. in relation to teachings at column 3, lines 14-18 and column 2, lines 17-24. But the claims require a particular relationship between collecting data and analyzing the data to identify portions of a heap deficient in component extraction, and then selecting for selective remedial treatment one or more of those portions of the heap and performing the selective for remedial on the selected portion(s), and neither Lesty et al. nor the other references cited for the rejection of those claims, alone or in combination, disclose or make obvious such a relationship within the context of the Claims.

Lesty et al. disclose a process for heap leaching that involves sinking injection wells into a heap and injecting leach solution into the heap by means of the injection wells. See, Lesty et al., for example, at column 1, line 67 through column 2, line 13. Lesty et al. also disclose that prior to sinking the injection wells the heap is terraced, with the width and difference in level between the terraces depending upon the spacing of injection wells, which spacing is linked to permeability of the material of the heap. See, Lesty et al. at column 3, lines 6-18. The Examiner specifically cited to the section in Lesty et al. at column 3, lines 14-18, where Lesty et al. disclose the use of pilot holes in the heap to determine permeability of the heap material, based on which

injection well spacing can then be determined. Lesty et al. specifically disclose that the permeability of the heap material can be determined from such pilot holes "by geophysical methods (for example, a seismic method, enabling the shape of the saturated zones to be defined)." From this passage, it is apparent that the pilot holes are used to test solution injection into the heap and the nature of fluid penetration (i.e., "the shape of the saturated zones") into the heap resulting from such injection tests, from which injection well spacing is determined for use on the heap, presumably so that injection wells are spaced sufficiently close to each other to result in effective leaching throughout the entire heap. Likewise, at column 3, lines 23-31, Lesty et al. further disclose that the injection wells "are implanted along the axis of each terrace on a grid which is advantageously defined by the results of a seismic survey," again confirming that the "pilot holes" of Lesty et al. are test wells drilled to test injection performance into the heap, which tests are evaluated using a seismic survey for the purpose of determining well spacing (and consequently the number of injection wells) in a grid of injection wells that would be required to leach the entire heap.

The Examiner also cites to the section of Lesty et al. at column 2, lines 17-24 where Lesty et al. makes reference to "geophysical surveys (for example, electrical or electromagnetic methods) or geological surveys". However, this reference in Lesty et al. is not even to the use of geophysical surveys on a heap, but rather for choosing an appropriate site on the ground on which the heap is to be constructed.

Likewise, with respect to Claim 28, the Milsom reference mentions a gravity method, but has no disclosure, alone or in combination of the other references, that makes obvious the required relationship of Claim 28 between a gravity survey, identifying portions of a heap deficient in component recovery, selecting one or more such portions for selective remedial treatment and performing the remedial treatment.

It is respectfully requested that the rejections under 35 U.S.C. § 103(a) should be withdrawn with respect to all claims.

It is believed that all of the issues raised in the Office Action have been addressed herein. New Claims 55-58 also involve selective remedial treatment of a heap based on a survey of the heap following prior heap leaching, and those claims are believed to be patentable over the references of

record. The application is believed to be in condition for allowance and allowance of all pending claims is earnestly requested. If the Examiner believes that it would be helpful to discuss any of the amendments or remarks presented, or to discuss possible Examiner amendments, the Examiner is respectfully invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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Date: July 29, 2009

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